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for

**ADJUSTABLE, LIGHTWEIGHT, COLLAPSIBLE QUILTING
APPARATUS AND METHODS FOR USING SAME**

1 **ADJUSTABLE, LIGHTWEIGHT, COLLAPSIBLE QUILTING**
2 **APPARATUS AND METHODS FOR USING SAME**

3 **BACKGROUND OF THE INVENTION**

4 **1. Related U.S. Applications**

5 This application is a continuation of U.S. Patent Application Serial No.
6 10/003,984, filed October 31, 2003 and entitled ADJUSTABLE, LIGHTWEIGHT,
7 COLLAPSIBLE QUILTING APPARATUS AND METHODS FOR USING SAME,
8 which is incorporated herein by reference.

9 **2. Field of the Invention**

10 This invention relates to quilting devices and, more particularly, to novel
11 apparatus and methods for quilting using sewing machines having an arbitrary throat
12 depths, wherein the sewing machine is supportably positioned on a movable frame
13 having a quilt engageably positioned in relation thereto.

14 **3. Description of Related Art**

15 Throughout American history, quilting has been a popular pastime. The craft
16 today has experienced a resurgence in popularity and enjoys immense participation by
17 hobbyists in quilting shows, magazines, newsletters, clubs, societies, and the like.
18 Although traditional quilt making may be at the root of this resurgence, the development
19 of modern textiles, machinery, and labor-saving sewing devices may be contributing to
20 this resurgence, as many activities compete for the time of the average hobbyist or
21 craftsperson.

22 Quilting typically involves stitching together multiple layers of fabric to form, in
23 a manner of speaking, a new fabric. In some instances, quilting may include sewing

1 together a myriad of smaller pieces of fabric to form a single composition fabric or
2 material. A quilt typically includes an upper and lower layer of fabric having a layer of
3 batting introduced therebetween for thickness, padding and/or warmth. As appreciated,
4 quilts may be created in various shapes and sizes, such as for example, from small and
5 ornamental, to those that cover large beds, or those that are mounted to decorate walls.

6 Designs or patterns are usually sewn or stitched into a quilt by hand or with a
7 sewing machine, thereby adding an artistic element to the craft of quilt making. Some
8 designs or patterns may be very elaborate, thus requiring a high degree of skill and
9 dexterity on the part of the craftsperson or hobbyist. In some cases, sewing machines may
10 be equipped with preprogrammed stitching patterns to assist in performing these tasks
11 more accurately and with a greater degree of intricateness than quilting by hand. More
12 importantly, extravagant quilting generally incorporates elaborate designs that may
13 require many hours of work even by the most skilled craftsperson.

14 Due to the extensive time commitment realized by atypical quilter using hand-
15 sewing methods to produce a quilt for a bed or for a decorative wall hanging, those
16 skilled in the art developed industrial quilting assemblies for use in producing quilts in
17 high quantities. These types of industrial quilting assemblies typically include heavy
18 duty, bulky sewing machines disposed in a stationary position wherein the subject quilt,
19 mounted on a quilting frame, is moved relative to the head of the sewing machine. A
20 significant disadvantage with these types of prior art industrial quilting assemblies is the
21 elaborate work area required to move and position the quilting frame supporting the
22 layers of quilting material relative to the stationary head of the sewing machine. In
23 particular, a very wide and long work space is generally required since the movement of

1 the quilting frame relative to the head of the sewing machine may encompass twice the
2 width and length of the support frame itself.

3 Household sewing machines have resulted in both tremendous time-savings and
4 quality improvements over traditional hand-sewing methods. Nevertheless, manipulating
5 large quilts with respect to stationary sewing machines is typically a cumbersome and
6 laborious process. "Long arm" quilting machines were developed by those skilled in the
7 art, in part, to address the problems associated with manipulating large quilts when
8 stitching the multiple layers of the quilt together. In particular, instead of moving a
9 quilting frame supporting a quilt with respect to a sewing machine, the quilting frame
10 may be maintained stationary and the sewing machine may then be moved with respect to
11 the width of the quilt. In order to accomplish this task successfully, a support frame is
12 generally needed to maintain the quilt in a substantially planar configuration, and a
13 carriage system may be needed to move the sewing machine with respect to the length
14 and width of the quilt.

15 Unfortunately, "long arm" sewing machines of the prior art are usually complex
16 in configuration, bulky, heavy, inflexible, and usually unaffordable to the typical
17 consuming hobbyist or quilting craftsman. As appreciated by those skilled in the art,
18 commercial "long arm" sewing machines may cost upwards of several thousand dollars,
19 making them generally out of reach and impractical to many quilting hobbyists.
20 Moreover, specially designed "long arm" sewing machines and fixed frame assemblies
21 are typically required to provide means for quilting using prior art quilting assemblies,
22 thereby making a hobbyist's household sewing machine practically unusable in the task.
23 In addition, many of the prior art quilting assemblies cannot perform desired stitching or

1 sewing since the maneuverability of the head of the sewing machine is affected by its
2 own mechanical and structural restrictions.

3 Conventional household sewing machines, which are generally intended to remain
4 stationary when being used for sewing, typically include many of the stitching functions
5 necessary for quilting, but may simply lack the wherewithal to be accurately movable
6 with respect to the dimensional length and width of a quilt so as to accomplish the
7 appropriate stitching and/or creative stitching designs desired by the user. In addition,
8 quilting assemblies of the prior art require special tables or frames to support a sewing
9 machine in relation thereto and to provide the appropriate tracking mechanisms necessary
10 to manipulate the sewing machine in relation to the layers of material forming the quilt,
11 thereby increasing the expense and bulkiness of these prior art systems and making
12 ordinary tables unworkable in connection therewith.

13 In addition to the foregoing, work space is typically an issue to the average
14 hobbyist or quilting craftsperson. Particularly, bulky "long arm" sewing machines usually
15 require large work areas and may be unsightly and awkward if located in areas of an
16 individual's home, such as a family room, den, dining room, bedroom, or living room.
17 Moreover, finding sufficient space to store conventional prior art "long arm" sewing
18 machines and quilting assemblies between uses typically poses a significant storage
19 problem to the average hobbyist or craftsperson.

20 As appreciated, since quilts may take on a wide variety of dimensional sizes and
21 shapes depending upon the use for which the quilt is being made, the fixed-size quilting
22 assemblies of the prior art typically prove to be too large, bulky, and generally awkward
23 for use with smaller quilts, while not being sufficiently expandable nor adjustable in
24 order to accommodate a larger or, in the alternative, a smaller quilting project.

1 Accordingly, the fixed-size quilting assemblies of the prior art are typically structurally
2 fitted to support a particular sized quilt by means of a fixed length quilting support frame.

3 Space limitations that are imposed by a family room, den, dining room, bedroom
4 or living room may further require a quilting assembly to be sufficiently adjustable to
5 accommodate the dimensions of the available work space. Thus, fixed-size quilting
6 assemblies of the prior art that are mounted to a support frame or structure (*e.g.*, working
7 surface or table having a fixed length and width) may be too cumbersome for the
8 available workspace and thereby restrict the working area required for quilting.

9 The working components of prior art quilting assemblies have also been found be
10 heavy, bulky in size, and generally awkward for the average hobbyist or craftsperson to
11 handle or move. Therefore, a quilting apparatus having a functional and structural design
12 that is adjustable in terms of size and configuration, collapsible for storage, sufficiently
13 lightweight for easy portability, and which provides ease of handling are important
14 features and characteristics to users of such quilting systems. Such a quilting apparatus
15 and methods for using the same of which the above-referenced disadvantages of the prior
16 art quilting assemblies are substantially eliminated is disclosed herein.

17

18 **SUMMARY OF THE INVENTION**

19 In view of the foregoing, it is a primary object of the present invention to provide
20 a quilting apparatus having many of the advantages of "long arm" quilting assemblies,
21 while providing a greater degree of simplicity, affordability, and flexibility to a user.

22 It is also an object of the present invention to provide a quilting apparatus that
23 makes use of a sewing machine of arbitrary throat depth being positionable on a carriage

1 assembly and which is capable of providing the sewing or stitching mechanism for the
2 quilt.

3 It is a further object of the present invention to provide a quilting apparatus
4 having a quilting frame that is mountable to a wide variety of ordinary table tops having
5 different dimensions, wherein the quilting frame is adjustable in its overall dimensional
6 width and length with respect to the table top.

7 It is another object of the present invention to provide a quilting apparatus that is
8 sufficiently lightweight for portability and collapsible for easy storage.

9 Consistent with the foregoing objects, and in accordance with the present
10 invention as embodied and broadly described herein, a method and apparatus are
11 disclosed in one presently preferred embodiment of the present invention as including a
12 quilting frame and a sewing machine carriage assembly. The quilting frame may include
13 two opposing end plates and one or more elongated support members disposed between
14 the two opposing end plates. A locking assembly selectively engages at least one of the
15 ends of the support member in such a manner so as to retain the fabric or material
16 comprising the quilt sufficiently tensioned between each of the support members.

17 In one presently preferred embodiment of the present invention, the elongated
18 support members may be configured having an extendable length or, in the alternative, a
19 fixed length. Preferably, the support members of the quilting frame comprise one or more
20 poles or spools. At least two, and preferably three or more support members supportably
21 engage a portion of the length of the opposing end plates of the quilting frame at a
22 spaced-apart relationship therebetween. The elongated support members are preferably
23 adjustable in length in relation to the disposition of the opposing end plates to
24 accommodate fabrics of various dimensions.

1 A carriage assembly may be used to maneuver a sewing machine with respect to
2 the length and width of the quilt supportably mounted between the support members of
3 the quilting frame. In one presently preferred embodiment, the carriage assembly may
4 include upper and lower carriage components that are capable of manual and/or
5 automated manipulation to facilitate the maneuverability of the sewing machine in both
6 lateral and longitudinal directions respective to the quilting material. Tracks may be used
7 to retain the upper and lower carriage components properly aligned in relation to each
8 other. In addition, a length of track may be used to keep the carriage assembly properly
9 aligned on a table top or other working surface.

10 A quilting apparatus made in accordance with one presently preferred
11 embodiment of the present invention includes a quilting frame configured to selectively
12 take up and pay out or deliver one or more pieces of fabric comprising a quilt, while
13 maintaining the fabric in a substantially planar orientation defined by lateral and
14 longitudinal dimensions. Consistent with the novel adjustable working components of the
15 quilting apparatus of the present invention, the quilting frame may be mountable to any
16 suitable working surface having an arbitrary length and providing a substantially smooth
17 upper surface. In fact, the working surface may include a table top or any other surface of
18 arbitrary length. The longitudinal dimension of the quilting frame may therefore be
19 adjustable to the length of the working surface or table top, as desired.

20 More particularly, in one presently preferred embodiment of the present
21 invention, the carriage assembly is configured to transport a sewing machine of arbitrary
22 throat depth along the width of one or more pieces of fabric comprising a quilt, wherein
23 the quilt has a length which supportably engages elongated support members of a quilting
24 frame mounted in relation to a suitable working surface (e.g., table top). The sewing

1 machine, as contemplated herein, may include a wide variety of conventional sewing
2 machines currently available in the marketplace. Functionally, the carriage assembly
3 provides means for moving the sewing machine with respect to the quilting fabric, along
4 both the lateral and longitudinal dimensions thereof, for the purpose of applying stitching
5 to at least a portion of the quilt.

6 In certain presently preferred embodiments, the carriage assembly includes an
7 upper carriage component and a corresponding lower carriage component. The lower
8 carriage component may be responsible for selectively transporting the sewing machine
9 along the longitudinal dimension of the quilting frame. With respect thereto, the upper
10 carriage component may preferably move along an upper surface of the lower carriage
11 component and be configured to selectively transport the sewing machine along the
12 lateral dimension of the quilting frame. As will be appreciated, in one presently preferred
13 alternate embodiment of the present invention, the carriage assembly does not include
14 upper and lower carriage components, but rather is formed as a single, unitary member,
15 translatable with respect to both the lateral and longitudinal dimensions of the fabric
16 comprising the quilt supportably engaging the elongated support members of the quilting
17 frame.

18 A track may be mounted on the working surface or table top in order to restrict
19 the movement of the lower carriage component in a predefined direction along the
20 longitudinal dimension of the quilting frame. In one presently preferred embodiment of
21 the present invention, the track may be provided in segments, thereby allowing a user to
22 adjust the length of the track according to the corresponding width of the fabric
23 comprising the quilt. In addition, a second track may be formed on the upper surface of
24 the lower carriage component to guide the upper carriage component in a predefined

1 directional relation thereto. For example, the second track may be formed in such a
2 manner so as to restrict the movement of the upper carriage to the direction defined by
3 the lateral dimension of the quilting frame and may further comprise end stops or
4 abutments to prevent the upper carriage component from becoming unexpectedly
5 disengaged from its relation to the lower carriage component.

6 The first track may include a recess formed along at least a portion of the length
7 of its upper surface. The recess being configured with a dimensional periphery sufficient
8 to engageably retain a portion of a wheel or caster of the lower carriage assembly therein.
9 Alternatively, a rib may be formed along at least a portion of the length of the upper
10 surface of the first track. The rib being configured with a dimensional periphery sufficient
11 to engageably retain a corresponding portion of a wheel or caster of the lower carriage
12 assembly in relation thereto.

13 Preferably, wheels or casters may be incorporated into the structural design of the
14 upper and lower carriage components to allow the carriage assembly to be translated in
15 two dimensions. As discussed hereinabove, guides may be formed along the length of the
16 track to retain the wheels or casters within a desired area or line of engagement, thus
17 preventing the carriage assembly from becoming disengaged from its mountable
18 relationship with the working surface or table top.

19 Similarly, the lower carriage assembly may include a recess formed along at least
20 a portion of the length of its upper surface. The recess being configured with a
21 dimensional periphery sufficient to engageably retain a portion of a wheel or caster of the
22 upper carriage assembly therein. Alternatively, a rib may be formed along at least a
23 portion of the length of the upper surface of the lower carriage assembly. The rib being
24 configured with a dimensional periphery sufficient to engageably retain a corresponding

1 portion of a wheel or caster of the upper carriage assembly in relation to the lower
2 carriage assembly.

3 An apparatus and method in accordance with the present invention may also
4 include at least two opposing end plates extending along the lateral dimension of the
5 quilting frame. The two opposing end plates are preferably configured to engage the
6 opposing ends of the support members, respectively, thus providing rotation points for
7 the support members when taking up or paying out the supported fabric or material
8 comprising the quilt. The positioning of the opposing end plates of the quilting frame
9 further provides means for maintaining a constant spaced-apart relationship between each
10 of the elongated support members.

11 The opposing end plates of the quilting frame may be supported by a height
12 adjustment assembly. In one presently preferred embodiment of the present invention,
13 the height adjustment assembly comprises at least one leg supporting each of the
14 opposing end plates. The support legs may be formed having a length sufficient to
15 facilitate an adjustment in the height of the quilting frame with respect the working
16 surface (*e.g.*, table top). Preferably, each support leg may be formed having a general L-
17 shaped configuration. Each of the support legs may be structurally disposed in relation to
18 at least a portion of the length of a respective end plate and may be secured to the
19 working surface by means of a securing assembly. In certain embodiments, the securing
20 assembly may include a clamp or bolt having arms that engage the support leg of the
21 quilting frame and the working surface (*e.g.*, table top).

22 Preferably, the support legs may be adjustably attached to the respective end
23 plates of the quilting frame, thus permitting the quilting frame to be height adjusted with
24 respect thereto. In certain preferred embodiments, each of the support legs may comprise

1 a slotted opening formed along a portion of its length, thus allowing the corresponding
2 end plate of the quilting frame to selectively slide along the length of the slotted opening.
3 A friction knob or other suitable adjustment mechanism may be tightened manually in an
4 effort to adjustably secure the opposing end plates of the quilting frame into position,
5 with respect to the legs. Conversely, the adjustment mechanism may be loosened with
6 respect to the engagement between the support leg and the end plate to facilitate sliding
7 movement- in relation to the slotted opening, thus providing means for height adjustment
8 of the quilting frame in relation to the working surface or table top.

9 In one presently preferred embodiment of the present invention, the support
10 members engage selective locking mechanisms to facilitate the support members being
11 selectively locked into or released from their engagement with the two opposing end
12 plates. In this regard, the support members and the opposing end plates may be easily
13 assembled and/or disassembled, thus facilitating ease of storage, compactibility and
14 portability.

15 The support members selectively engage the locking mechanism at one or both
16 ends thereof. In one presently preferred embodiment of the present invention, the locking
17 mechanism comprises a ratchet. The ratchet preferably comprises a gear configured to
18 interlock with a locking member (*e.g.*, pawl) disposed in a corresponding location along
19 the length of one or both of the opposing end plates, thereby allowing the support
20 members to rotate in relation to the opposing end plates in only a single direction. In this
21 manner, tension may be selectively applied and maintained along the length of the quilt
22 engaging the support members to discourage sagging or slack. As appreciated, the
23 locking members may be selectively disengaged from its locking engagement with the
24 respective gear of the support members to allow the support members to turn freely in

1 either direction, thereby allowing a user to add or remove fabric along the length of the
2 support members.

3

4 **BRIEF DESCRIPTION OF THE DRAWINGS**

5 The foregoing and other objects and features of the present invention will become
6 more fully apparent from the following description and appended claims, taken in
7 conjunction with the accompanying drawings. Understanding that these drawings depict
8 only typical embodiments of the invention and are, therefore, not to be considered
9 limiting of its scope, the invention will be described with additional specificity and detail
10 through use of the accompanying drawings in which:

11 Figure 1 is a perspective view of one presently preferred embodiment of a quilting
12 apparatus in accordance with the present invention;

13 Figure 2 is side sectional view illustrating one presently preferred embodiment of
14 the relationship of the support members of a quilting frame to a sewing machine
15 mountably disposed in relation to a carriage assembly in accordance with one presently
16 preferred embodiment of the present invention;

17 Figure 3 is a side sectional view illustrating an alternative presently preferred
18 embodiment of the relationship of the support members of a quilting frame to a sewing
19 machine mountably disposed in relation to a carriage assembly;

20 Figure 4 is a perspective view of one presently preferred embodiment of a locking
21 mechanism for retaining proper tension along the length of the quilt;

22 Figure 5 is a perspective view of one presently preferred embodiment of a
23 carriage assembly illustrating the structural relationship of an upper carriage component,

1 a lower carriage component and a first and second track providing means for assisting
2 with the maneuverability of the carriage assembly relative to a quilting frame; and

3 Figure 6 is a perspective view of one presently preferred alternative embodiment
4 of a carriage assembly having casters adapted in relation thereto to facilitate the
5 maneuverability of the carriage assembly relative to a quilting frame.

6

7 **DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS**

8 It will be readily understood that the components of the present invention, as
9 generally described and illustrated in the Figures herein, could be arranged and designed
10 in a wide variety of different configurations. Thus, the following more detailed
11 description of the embodiments of the system and method of the present invention, as
12 represented in Figures 1 through 6, is not intended to limit the scope of the invention, as
13 claimed, but is merely representative of the presently preferred embodiments of the
14 invention.

15 The presently preferred embodiments of the invention will be best understood by
16 reference to the drawings, wherein like parts are designated by like numerals throughout.

17 One presently preferred embodiment of quilting apparatus of the present
18 invention, designated generally at 10, is best illustrated in Figures 1 and 2. As shown, the
19 quilting apparatus 10 includes a quilting frame 12 and a carriage assembly 18 configured
20 to mountably support a sewing machine 20 having an arbitrary throat depth 41.
21 Preferably, the quilting frame 12 is mounted relative to a working surface 14 and
22 supportably retains one or more layers of fabric in a substantially planar orientation to
23 accommodate sewing and stitching by the sewing machine 20. The carriage assembly 18
24 may be configured to transport the sewing machine 20 in both lateral and longitudinal

1 directions 17, 19 with respect to the disposition of the fabric relative to the quilting frame
2 12. The maneuverability of the carriage assembly 18 relative to the length of the fabric
3 forming the quilt provides a means for stitching patterns and/or designs into at least a
4 portion of the body of the quilt.

5 A sufficient amount of tension may be applied to the fabric supported by the
6 quilting frame 12 in an effort to facilitate proper alignment between the fabric to be sewn
7 and stitched together to form a quilt having a desired size and shape. Preferably, the
8 height of the quilting frame 12 may be adjusted with respect to the working surface 14
9 (e.g., table top) by means of a height adjustment assembly 16. In one presently preferred
10 embodiment, the height adjustment assembly 16 comprises at least one support leg 30, a
11 slotted opening formed in the length of the support leg 30, and an adjustable mechanism
12 34 that selectively engages the support leg 30, and the quilting frame 12 in a secure
13 position relative to each other.

14 In one presently preferred embodiment of the present invention, the quilting frame
15 12 may comprise at least one elongated support member 22 and two opposing end plates
16 24. Preferably, two or more support members 22a, 22b, 22c are engageably disposed in
17 relation to the opposing end plates 24a, 24b. The elongated support members 22a, 22b,
18 22c may comprise poles which act as spools for supportably engaging a length of the
19 fabric comprising the quilt. Structurally, a first support member 22a may act as a spool
20 for a lower layer of fabric, while a second support member 22b may act as a spool for an
21 upper layer of fabric, as best shown in Figure 2. One or more layers of padding or batting
22 (not shown) may be introduced or fed between the first and second support members 22a,
23 22b for the purpose of inserting the same between the upper and lower layers of the fabric
24 which comprises the quilt. Specifically, a portion of the length of the quilt may be

1 selectively payed out or delivered by the first and second support members 22a, 22b
2 which act as spools to a third support member 22c whereupon the finished portion of the
3 quilt may be stored.

4 Referring back to Figure 1, the two opposing end plates 24a, 24b of the quilting
5 frame 12 may be configured to supportably retain opposing ends of the support members
6 22a, 22b, 22c, respectively. In one presently preferred embodiment of the present
7 invention, the opposing end plates 24a, 24b of the quilting frame 12 may be formed of a
8 sufficiently sturdy material. For example, the opposing end plates 24 may be formed of
9 metal, wood, ceramic, fiberglass, graphite, any of numerous organic, synthetic or
10 processed materials that are mostly thermoplastic or thermosetting polymers of high
11 molecular weight, with or without additive, such as, plasticizers, auto oxidants, extenders,
12 colorants, ultraviolet light stabilizers, or fillers, which can be shaped, molded, cast,
13 extruded, drawn, foamed or laminated into objects, films, or filament, or any other
14 composite materials or combinations thereof which are consistent with the spirit and
15 scope of the present invention.

16 Receiving apertures 28a, 28b, 28c are preferably formed along the length of each
17 of the end plates 24a, 24b. The receiving apertures 28a, 28b, 28c may also be disposed in
18 a spaced-apart relationship to each other to provide a corresponding displacement
19 between each of the support members 22a, 22b, 22c. The receiving apertures 28a, 28b,
20 28c are preferably configured having an internal periphery sufficient to receive an
21 opposing end of a support member 22 and, accordingly, to provide a point of rotation for
22 the engaging support member to selectively rotate in relation thereto.

23 A retention mechanism 28a, 28b, 28c, such as a biased locking pin, may be
24 formed at the opposing ends of each of the support members 22a, 22b, 22c, respectively,

1 to provide a means for selectively securing an engaging relationship between the support
2 members 22 and the opposing end plates 24. Accordingly, this structural arrangement and
3 design between the support members 22 and the opposing end plates 24 thereby allows
4 each of the support members 22 to be easily assembled or disassembled from its
5 engagement with the receiving apertures 26 of the opposing end plates 24, independent of
6 each other, and collapsed for storage and ease of portability.

7 In one presently preferred embodiment of the present invention, the support
8 members 22a, 22b, 22c may be formed of a sufficiently rigid material. For example, the
9 support members 22a, 22b, 22c may be formed of metal, wood, ceramic, fiberglass,
10 graphite, any of numerous organic, synthetic or processed materials that are mostly
11 thermoplastic or thermosetting polymers of high molecular weight, with or without
12 additive, such as, plasticizers, auto oxidants, extenders, colorants, ultraviolet light
13 stabilizers, or fillers, which can be shaped, molded, cast, extruded, drawn, foamed or
14 laminated into objects, films, or filament, or any other composite materials or
15 combinations thereof which are consistent with the spirit and scope of the present
16 invention. In addition, the elongated support members 22a, 22b, 22c may be configured
17 having an extendable length. Accordingly, the effective length of the support members
18 22a, 22b, 22c may be extendable, so that the quilting frame 12 may accommodate fabrics
19 of various dimensions and be mounted on a working surface 14 having an arbitrary
20 length. For example, the support members 22a, 22b, 22c may be telescopic, such as
21 having telescopic sections 23a, 23b, or may simply have segments 23a, 23b which may
22 be added or removed to increase and/or decrease the effective length of the support
23 members 22a, 22b, 22c, as needed. In operational design, the support members 22a, 22b,
24 22c which are telescopic or provided in segments 23 a, 23b may be collapsible and easily

1 stored. As will be appreciated by those skilled in the art, the support members 22a, 22b,
2 22c engaging the opposing end plates 24a, 24b may, alternatively, be formed having a
3 fixed length, if desired.

4 In one presently preferred embodiment of the present invention, the support
5 members 22a, 22b, 22c engage selective locking mechanisms 38a, 38b, 38c, respectively,
6 to facilitate the support members being selectively locked into or released from their
7 engagement with the two opposing end plates 24a, 24b. In this regard, the support
8 members 22a, 22b, 22c and the opposing end plates 24a, 24b may be easily assembled
9 and/or disassembled to facilitate ease of storage, compactibility and portability.

10 The support members 22a, 22b, 22c may selectively engage the locking
11 mechanism 38a, 38b, 38c at one or both ends thereof. In one presently preferred
12 embodiment of the present invention, the locking mechanism 38a, 38b, 38c comprises a
13 ratchet. As best shown in Figure 4, the ratchet preferably comprises a gear 58 configured
14 to interlock with a locking member 60 (e.g., pawl) disposed in a corresponding location
15 along the length of one or both of the opposing end plates 24a, 24b, thereby allowing the
16 support members 22a, 22b, 22c to rotate in relation to the opposing end plates 24a, 24b in
17 only a single direction. In this manner, tension may be selectively applied and
18 maintained along the length of the fabric engaging the support members 22a, 22b, 22c in
19 an effort to discourage sagging or slack in the quilt. As appreciated, the locking members
20 39 may be selectively disengaged from their locking engagement with a respective gear
21 58 of each of the support members 22a, 22b, 22c in order to allow the support members
22 to turn freely in either direction. In this regard, fabric may be added or removed along the
23 length of the support members 22a, 22b, 22c.

1 Referring now to Figure 2, in one presently preferred embodiment of the present
2 invention, the quilting apparatus 10 may store an upper fabric layer 52 of the quilt on the
3 support member 22b and a lower fabric layer 54 of the quilt on the support member 22a.
4 A portion of batting, filling or padding may also be fed in at an entry point 56 disposed
5 between the upper and lower fabric layers 52, 54. In certain other embodiments, a portion
6 of batting, filling or padding may be stored on a spool and selectively supplied between
7 the upper and lower fabric layers 52, 54 of the quilt at the entry point 56. In other
8 instances, a portion of batting, filling or padding may be stored together with the upper
9 and lower layers 52, 54 of the quilt on either or both of the support members 22a, 22b.

10 In preferred operation, both the upper and lower fabric layers 52, 54 of the quilt
11 are sewn or stitched by the needle of the sewing machine 20 mounted on the carriage
12 assembly 18 and subsequently rotatably positioned for storage on the support member
13 22c. As best shown in Figure 1, the support member 22c that preferably receives the
14 quilted upper and lower fabric layers 52, 54 may pass through the length of the throat
15 depth 41 of the sewing machine 20. In this regard, the upper and lower fabric layers 52,
16 54 may be moved from their supportable engagement with the support members 22a, 22b
17 to the support member 22c.

18 Referring now to Figure 3, in another presently preferred embodiment of the
19 present invention, the upper and lower fabric layers 52, 54 of the quilt may be selectively
20 stored on a single support member 22a. Specifically, this may include the upper and
21 lower fabric layers 52, 54 of the quilt and any material inserted therebetween (e.g.,
22 batting, filling or padding). In certain instances, the fabric layers 52, 54 may be fed
23 above or below the relative disposition of the support pole 22b according to the amount

1 of material on the support pole 22a and in such manner so as to maintain alignment of the
2 fabric layers 52, 54 in relation to the needle or foot 40 of the sewing machine 20.

3 In general operation, the support members 22a, 22b may be used in a variety of
4 ways to accommodate movement of the upper and lower fabric layers 52, 54 of the quilt
5 according to the nature of a project, including the amount of fabric being used, if the
6 layers are separate or already together, and so forth. Referring to Figure 4, an angular
7 bend 55 may also be incorporated into either end of the opposing end plates 24a, 24b to
8 ease the feeding of the fabric layer 54 through the throat depth 41 of the sewing machine
9 20, especially in cases where a large roll of fabric layers 52, 54, and possibly batting, are
10 retained in selective engagement along the length of the support member 22a. Thus, the
11 various structural components of the quilting apparatus 10 of the present invention
12 provide a degree of versatility to a user.

13 Referring back to Figure 1, the opposing end plates 24a, 24b of the quilting frame
14 12 may be supported by a height adjustment assembly 16. In one presently preferred
15 embodiment of the present invention, the height adjustment assembly 16 comprises at
16 least one leg 30a, 30b supporting each of the opposing end plates 24a, 24b. The support
17 legs 30a, 30b may be formed having a length sufficient to facilitate an adjustment in the
18 height of the quilting frame 12 with respect the working surface (e.g., table top) 14.
19 Preferably, each support leg 30 may be formed having a general L-shaped configuration.
20 In addition, each of the support legs 30, 30b may be structurally disposed in relation to at
21 least a portion of the length of a respective end plate 24a, 24b and may be secured to the
22 working surface 14 by means of a securing assembly 36. In certain presently preferred
23 embodiments, the securing assembly 36 may include a clamp or bolt having arms that
24 engage the working surface (e.g., table top) 14 and the support legs 30a, 30b which

1 supportably engage the opposing endplates 24a, 24b of the quilting frame 12. Preferably,
2 the support legs 30a, 30b may be adjustably attached to the respective end plates 24a, 24b
3 of the quilting frame 12, thus permitting the quilting frame to be height adjusted with
4 respect thereto.

5 In one presently preferred embodiment of the present invention, each of the
6 support legs 30a, 30b may comprise a slotted opening 32a, 32b formed along a portion of
7 its length, thus allowing the corresponding end plate 24a, 24b of the quilting frame 12 to
8 be selectively slid along the length of the slotted opening 32a, 32b. An adjustment
9 mechanism 34 (*e.g.*, conventional fasteners, a friction knob, adjustable screw or the like)
10 may be adjusted in an effort to selectively secure the opposing end plates 24a, 24b of the
11 quilting frame 12 into a position with respect to the support legs 30a, 30b. Conversely,
12 the adjustment mechanism 34 maybe loosened with respect to its securing engagement
13 between the support leg 30a, 30b and the end plate 24a, 24b in order to facilitate a sliding
14 movement in relation to the slotted opening 32a, 32b, thus providing means for height
15 adjustment of the quilting frame 12 in relation to the working surface (*e.g.*, table top) 14.
16 Therefore, the height of the quilting frame 12 (and the corresponding height of the fabric
17 layers 52, 54 of the quilt being sewn) may be adjusted to an arbitrary height relative to
18 the needle 40 of the sewing machine 20. To this end, it will be readily appreciated that
19 other adjustment mechanisms may be constructed in accordance with the inventive
20 principles set forth herein. It is intended, therefore, that the examples provided herein be
21 viewed as exemplary of the principles of the present invention, and not as restrictive to a
22 particular structure for implementing those principles.

23 As discussed hereinabove, the support members 22a, 22b, 22c may selectively
24 engage the locking mechanisms 38a, 38b, 38c disposed at one or both ends thereof. The

1 locking mechanisms 38a, 38b, 38c preferably function to restrict the rotation of the
2 support members to a single direction, thereby providing a means for maintaining tension
3 in the body of the fabric layers 52, 54.

4 In one presently preferred embodiment, each of the locking mechanism 38a, 38b,
5 38c comprises a ratchet, as best shown in Figures 1 and 4. Each of the ratchets 38a, 38b,
6 38c preferably comprises a gear 58a, 58b, 58c configured to interlock with a locking
7 member (e.g., pawl) 60a, 60b, 60c disposed in a corresponding location along the length
8 of one or both of the opposing end plates 24a, 24b, thereby allowing the support members
9 22a, 22b, 22c to rotate in relation to the opposing end plates 24a, 24b in a single
10 direction. In this manner, tension may be selectively applied and maintained along the
11 length of the fabric engaging the support members 22a, 22b, 22c in an effort to
12 discourage sagging or slack in the fabric layers 52, 54 forming the quilt. As appreciated,
13 the locking members 60a, 60b, 60c may be selectively disengaged from their locking
14 engagement with the respective gear 58a, 58b, 58c of each of the support members 22a,
15 22b, 22c in order to allow the support members to turn freely in either direction. In this
16 regard, fabric may be added or removed along the length of the support members 22a,
17 22b, 22c.

18 In one presently preferred embodiment of the present invention, the locking
19 member (e.g., pawls) 60a, 60b, 60c may be connected to the opposing end plates 24a, 24b
20 by any conventional fastener or other suitable pivot means sufficient to allow the locking
21 member to selectively engage and disengage the respective gear 58a, 58b, 58c of the
22 support member 22a, 22b, 22c. Similarly, the gears 58a, 58b, 58c may be connected to
23 the opposing ends of the support members 22a, 22b, 22c by any conventional fastener

1 sufficient to support a fixed relationship between the end of the respective support
2 member and the gear.

3 In general, any means capable of selectively locking and unlocking the rotation of
4 the support members 22a, 22b, 22c, including the use of electrical motors, may be
5 employed by the quilting apparatus of the present invention and need not be limited to a
6 ratchet mechanism herein described. To this end, it will be appreciated that other locking
7 mechanisms may be constructed in accordance with the inventive principles set forth
8 herein. It is intended, therefore, that the examples provided herein be viewed as
9 exemplary of the principles of the present invention, and not as restrictive to a particular
10 structure for implementing those principles.

11 Referring now to Figures 1 and 5, the carriage assembly 18 may be used to
12 maneuver the sewing machine 20 with respect to the fabric layers 52, 54 forming the quilt
13 and supportably mounted between the support members 22a, 22b, 22c of the quilting
14 frame 12. Preferably, the carriage assembly 18 is formed of a sufficiently rigid material.
15 For example, the carriage assembly 18 may be formed of metal, wood, ceramic,
16 fiberglass, graphite, any of numerous organic, synthetic or processed materials that are
17 mostly thermoplastic or thermosetting polymers of high molecular weight, with or
18 without additive, such as, plasticizers, auto oxidants, extenders, colorants, ultraviolet light
19 stabilizers, or fillers, which can be shaped, molded, cast, extruded, drawn, foamed or
20 laminated into objects, films, or filament, or any other composite materials or
21 combinations thereof which are consistent with the spirit and scope of the present
22 invention.

23 In one presently preferred embodiment of the present invention, the carriage
24 assembly 18 may include an upper carriage component 42 and a lower carriage

1 component 44 which are capable of manual and/or automated manipulation to facilitate
2 the maneuverability of the sewing machine 20 in both lateral and longitudinal directions
3 17, 19 respective to the quilting frame 12. Consistent with the novel adjustable working
4 components of the quilting apparatus 10 of the present invention, the quilting frame 12
5 may be supported or mounted on any suitable working surface 14 having an arbitrary
6 length and providing a substantially smooth upper surface. The working surface 14
7 preferably includes a table top. The longitudinal dimension of the quilting frame 12 may
8 therefore be adjustable to the length of the working surface (e.g., table top) 14, as desired.

9 More particularly, in one presently preferred embodiment of the present
10 invention, the carriage assembly 18 is configured to transport the sewing machine 20 of
11 arbitrary throat depth 41 along the length of one or more layers of fabric 52, 54
12 comprising the quilt, wherein the quilt has a length which supportably engages the
13 elongated support members of the quilting frame 12 mounted in relation to the working
14 surface (e.g., table top) 14. The sewing machine 20, as contemplated herein, may include
15 a wide variety of conventional sewing machines currently available in the marketplace.
16 Functionally, the carriage assembly 18 provides means for moving the sewing machine
17 20 with respect to the fabric layers 52, 54, along both the lateral and longitudinal
18 dimensions thereof, for the purpose of applying stitching, including both patterns and
19 designs, to at least a portion of the body of the quilt.

20 In certain presently preferred embodiments, the carriage assembly 18 includes an
21 upper carriage component 42 and a corresponding lower carriage component 44. The
22 lower carriage component 44 may be responsible for selectively transporting the sewing
23 machine 20 along the longitudinal dimension 19 of the quilting frame 12. With respect
24 thereto, the upper carriage component 42 may preferably move along an upper surface 49

1 of the lower carriage component 44 and be configured to selectively transport the sewing
2 machine 20 along the lateral dimension 17 of the quilting frame 12.

3 As will be appreciated, in one presently preferred alternate embodiment of the
4 present invention, a carriage assembly (not shown) may not include upper and lower
5 carriage components, but rather be formed as a single, unitary member, translatable with
6 respect to both the later and longitudinal dimensions of the quilting frame. Moreover, one
7 or more electric motors (not shown) may be provided in conjunction with the movement
8 of the carriage assembly to facilitate controlled movements of the sewing machine
9 mounted in relation to the carriage assembly.

10 At least one length of track 21 may be used to retain the carriage assembly 18
11 properly aligned on the working surface (e.g., table top) 14. Preferably, two pieces of
12 track 21a, 21b may be mounted on the working surface 14 in order to restrict the
13 movement of the lower carriage component 44 in a predefined direction along the
14 longitudinal dimension 19 of the quilting frame 12. In one presently preferred
15 embodiment of the present invention, the track 21a, 21b may be provided in segments
16 23a, 23b, thereby allowing a user to adjust the length of the track according to the
17 corresponding width of the fabric layers 52, 54 comprising the quilt and/or to fit the
18 length of a working surface (e.g. table top) 14. The runners 50a, 50b may be attached to
19 the table surface 14 or working surface 14 by any suitable means, including tape,
20 adhesive, screws, or the like.. In addition, a second track 50a, 50b may be formed along
21 the upper surface 49 of the lower carriage component 44 to guide the upper carriage
22 component 42 in a predefined directional relation thereto. For example, the track 50a, 50b
23 formed in the upper surface 49 of the lower carriage component 44 may restrict the
24 movement of the upper carriage component 42 to the direction defined by the lateral

1 dimension 17 of the quilting frame 12. Additionally, the second track 50a, 50b may
2 comprise end stops or abutments 62 having a dimension sufficient to prevent the upper
3 carriage component 42 from becoming disengaged from its relation to the lower carriage
4 component 44.

5 A plurality of rollers (*e.g.*, wheels) 48a, 48b, 48c, 48d may be incorporated into
6 the structural design of the lower carriage component 44 for engaging the track 21a, 21b
7 mounted in relation to the working surface 14, thus providing means for maneuvering the
8 sewing machine 20 mounted in relation to the carriage assembly 18 in the longitudinal
9 direction 19 of the quilting frame 12. Similarly, a plurality of rollers (*e.g.*, wheels) 46a,
10 46b, 46c, 46d may be incorporated into the structural design of the upper carriage
11 component 42 for engaging the track 50a, 50b formed in the upper surface 49 of the
12 lower carriage component 44, thus providing means for maneuvering the sewing machine
13 20 mounted in relation to the carriage assembly 18 in the lateral direction 17 of the
14 quilting frame 12.

15 In one presently preferred embodiment, the track 21a, 21b mounted in relation to
16 the working surface 14 may include a guide (*e.g.*, raised rib) 51a, 51b formed along at
17 least a portion of the length of its upper surface. The rib 51a, 51b is preferably configured
18 having a dimensional periphery sufficient to engage a recessed portion of the wheels 48a,
19 48b, 48c, 48d of the lower carriage component 44 in a mountable relation thereon. In an
20 alternate presently preferred embodiment, the guide 51a, 51b may comprise a recess (not
21 shown). The recess may be formed along at least a portion of the length of the upper
22 surface of the track 21. Preferably, the recess may be configured having a dimensional
23 periphery sufficient to engage a corresponding leading portion of the wheels 48a, 48b,
24 48c, 48d of the lower carriage component 44 in a mountable relation thereto. It will be

1 appreciated that other means for guiding 51 the rollers 46, 48 of the upper and lower
2 carriage components may be constructed in accordance with the inventive principles set
3 forth herein. It is intended, therefore, that the examples provided herein be viewed as
4 exemplary of the principles of the present invention, and not as restrictive to a particular
5 structure for implementing those principles.

6 Additionally, the upper carriage component 42 may include one or more handles
7 64a, 64b to facilitate an ease in manually maneuverability of the carriage assembly 18
8 and corresponding mounted sewing machine 20 in the linear and longitudinal directions
9 17, 19 of the quilting frame 12 along the tracks 21a, 21b, 50a, 50b to stitch or sew
10 patterns or designs in the fabric layers 52, 54 comprising the quilt.

11 Referring now to Figures 2 and 6, in one presently preferred alternate
12 embodiment of the present invention, a carriage assembly 118 may not include upper and
13 lower carriage components, but rather be formed as a single; unitary member translatable
14 with respect to both the later and longitudinal directions 17, 19 of the fabric layers 52, 54
15 forming the quilt mounted in relation to the support members 22a, 22b, 22c of the
16 quilting frame 12. At least one and preferably a plurality of casters 66a, 66b, 66c, 66d
17 may be incorporated into the structural design of the carriage assembly 118 for engaging
18 the working surface 14, thus providing means for maneuvering the sewing machine 20
19 mounted in relation to the carriage assembly 118 in the lateral and longitudinal directions
20 17, 19 of the quilting frame 12. The carriage assembly 118 may include one or more
21 handles 64a, 64b to facilitate an ease in manually maneuverability of the carriage
22 assembly 18 and corresponding mounted sewing machine 20 in relation to the fabric
23 layers 52, 54 forming the quilt. In certain alternate embodiments of the present invention,
24 motors (not shown) may be provided in conjunction with controlling the movement of the

1 carriage assembly 118 relative to the quilting frame 12. To assist in providing a form of
2 controlled movement, tracks 68a, 68b may be mounted in relation to the working surface
3 14 in an effort to restrict the overall maneuverability of the carriage assembly 18 relative
4 to the working surface (e.g., table top) 14 and the quilting frame 12.

5 Referring now to one presently preferred method for guiding a sewing machine
6 relative to at least one layer of fabric mounted on a quilting frame, the method
7 comprising the steps of. (1) mounting the quilting frame with respect to the working
8 surface; (2) spooling at least a portion of one or more fabric layers in relation to support
9 members of the quilting frame; (3) paying out the fabric layers in a substantially planar
10 orientation with the quilting frame defined by lateral and longitudinal dimensions,
11 wherein the longitudinal dimension of the quilting frame being selectively adjustable to
12 the length of the working surface; and (4) guiding the sewing machine with respect to the
13 fabric along both the lateral and longitudinal dimensions of the quilting frame by means
14 of a carriage assembly supported by the working surface.

15 In addition, one presently preferred method of the present invention may comprise
16 the additional steps of adjusting the height of the quilting frame with respect to the
17 working surface and selectively restricting the rotation of the support member of the
18 quilting frame in a single direction to provide a suitable amount of tension in the fabric
19 layers forming the quilt.

20 In structural design, the various working components of the quilting apparatus are
21 preferably formed of a lightweight polymeric material to facilitate an ease in portability
22 and are configured in such a manner so as to be easily assembled and disassembled for
23 compactibility and storage.

1 From the above discussion, it will be readily appreciated that the present
2 invention provides a quilting apparatus and methods for using the same having many of
3 the advantages of "long arm" quilting assemblies, while providing a greater degree of
4 simplicity, affordability, and flexibility to a user. In addition, the present invention
5 provides a quilting apparatus that makes use of a sewing machine of arbitrary throat
6 depth being positionable on a carriage assembly and which is capable of providing the
7 sewing or stitching mechanism for the quilt.

8 Unlike prior quilting assemblies, the present invention provides a quilting
9 apparatus having a quilting frame that is mountable to a wide variety of ordinary table
10 tops having different dimensions, wherein the quilting frame is adjustable in its overall
11 dimensional width and length with respect to the table top. Similarly, the present
12 invention provides a quilting apparatus that is sufficiently lightweight for portability and
13 collapsible for easy storage.

14 The present invention may be embodied in other specific forms without departing
15 from its spirit or essential characteristics. The described embodiments are to be
16 considered in all respects only as illustrative, and not restrictive. The scope of the
17 invention is, therefore, indicated by the appended claims, rather than by the foregoing
18 description. All changes which come within the meaning and range of equivalency of the
19 claims are to be embraced within their scope.

20 What is claimed and desired to be secured by United States Letters Patent is: